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THE
PROBABLE CAUSE,
NATURE,

AND

MODE OF TREATMENT,

OF

THE PREVAILING DISEASE

TERMED

CHOLERA MORBUS.

SUGGESTED BY

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TO THE MEDICAL PROFESSION.

GENTLEMEN,

IN venturing to lay before the public my conclusions upon the important topic of the prevailing disease, termed Cholera Morbus, I need scarcely observe the very great diffidence, which an individual circumstanced as I am, must feel, in advancing opinions with the view of influencing the minds of the numerous learned gentlemen of the profession, who have occupied themselves, for months since, in investigating the nature, cause, and treatment, of so powerful a disease, and so direful a scourge.

Notwithstanding all their exertions, unhappily they have come to no just conclusions. Some placing the seat of the affection in the brain and spinal marrow, and others in the digestive apparatus; but as far as post-mortem examinations can determine, neither of these organs have presented any uniform remarkable alteration. Some are recommending bleeding and the use of stimulants, whilst others are contending with an equal degree of ingenuity its injurious consequences. Some also the use of calomel and opium, whilst others are condemning them as poisons; and so on, remedies

after remedies have been recommended, till, at length, I think, we shall go through the whole pharmacopœia.

As a scientific mode of treatment of any disease is founded entirely upon a knowledge of its nature, and as we are ignorant of that in this disease, how can our treatment be otherwise than empirical? Does not the want of that knowledge sufficiently account for the numerous opposite modes of treatment which have been recommended and adopted?

Amidst this chaos of mystery and discrepencies of opinions upon a topic, which involves the life of every individual in the country, from the king to the peasant, the lives of men, women, and children, of all ranks and classes, it behoves every one who is capable of forming an opinion upon the subject, to advance it for public scrutiny.

Relying upon the honest feelings which ought to actuate all learned men—I mean, that of seeking truth, and receiving it from whom and wheresoever it should come—likewise emboldened by the importance of the topic, I hesitate not to offer my feeble exertions in enquiring into the nature of the affection, for upon a knowledge of this alone can a rational mode of treatment be devised. I imagine, therefore, that there exists sufficient apology for my apparent temerity.

In the following investigation, it is my intention to avoid all discussions relative to contagion, non-contagion, and infection, &c., as they are endless, and to me quite unsatisfactory. I shall neither attempt to prove any identity of the prevailing epidemic in England with that of Asiatic Cholera, as it is called. I shall simply confine myself to the facts, respecting the symptoms

and post-mortem appearance of the disease, such as its exists in this country.

My opinion of the disease is as follows :—

First, That the disease is caused by a vitiated state of atmosphere.

Secondly, That the effects of this vitiated state of the atmosphere is to interrupt the proper chemical changes in the lungs, necessary for arterializing the blood, thereby producing a state analogous to asphyxia, caused by inhaling noxious gazes.

Thirdly, Death is caused by asphyxia; and,

Fourthly, I shall offer a few remarks as to treatment.

With respect to my first proposition, I have only to observe, that in order to prove that the atmospheric air is really deteriorated, possessing noxious qualities, and unfit for the ordinary processes of respiration, I should resort to chemical analysis.* But as this branch of science is far from being perfect, notwithstanding the very great improvements which have been recently made here and on the continent, I regret to say chemists have not yet been able to devise any means for detecting those occasional injurious changes, which the atmosphere undergoes, and which we know to exist only from its influence on our senses and constitutions. Seguin examined the infectious air of

* There is a peculiar constitution of the atmosphere now prevalent, possessing a great depressing power on the human body. The type of fever is extremely low, and there is an epidemic erysipelas which manifests itself to a vast extent in the wards of the metropolitan hospitals.—*2nd No. of Med. and Surg. Journal.*

an hospital, the odour of which was almost intolerable, and he could discover no appreciable deficiency of oxygen, or other peculiarity of composition.

We cannot, however, be at a loss to conceive how the atmosphere may become vitiated in its properties, when we contemplate the changes which are perpetually wrought upon the earth. The surface of the earth is incessantly undergoing alterations, through chemical or mechanical actions. Decompositions of animal and vegetable substances are always going on. The oxygen of the air is in constant consumption, and is as constantly reproduced. The polluted waters, by a process of spontaneous distillation, are rendered pure. Emanations are perpetually given off from marshes, sewers, privies, burial grounds, &c. &c. all of which deleterious matters are received into the atmosphere, that being their common receptacle. All these additional matters tend to dilute the proper component parts of the air destined by nature for the support of life.

Reviewing the various means by which the air may be rendered noxious to life, and knowing our incapability of appreciating its changes, and of what these consist, it will suffice for me, I think, in proving that this noxious state of the atmospheric air exists. If in the progress of my investigation, I can show that the symptoms and post-mortem appearances of a person who has died of Cholera (as it is called) are analogous to those which are observed to take place in those animals who have been purposely made to respire the irrespirable gases, also to those which have appeared in the individuals who have been accidentally placed under their influence.

Since it has been established by Scheele and Lavoisier that the oxygen of the air is the chief chemical property—without which air is nearly inert—it can no longer support combustion and respiration, we may readily conceive how numerous are the causes by which respiration may be interrupted. Let me enumerate a few.

Various are the ways in which respiration, or rather the salutary effects of respiration on the blood, may be interrupted. It is obvious, in the first place, that since the beneficial effect here alluded to, is owing to the presence of oxygen, a deficiency or absence of this in the air respired must produce asphyxia; a too great a degree of rarefaction in the atmospheric air. Azotic, hydrogen, and carbonic acid gases are air too highly rarefied to maintain life. Carburetted hydrogen, chlorine, sulphureous, nitric acid, and ammoniacal gases, also the gases emanating from putrefying animal and vegetable substances, interrupt the proper arterIALIZATION of the blood. All these, therefore, may be reckoned as causes of asphyxia, and either of which properties may be contained in a detrimental proportion in the atmosphere. Besides the above causes of asphyxia, drowning, suffocation, strangulation, and other mechanical interruptions to breathing, can produce the same state. These different and numerous agents produce certain modifications of effect or symptoms peculiar to each of these causes.

As to my second position, having premised the above remarks upon atmospheric air and the irrespirable gases, I shall proceed to detail briefly what are the objects which respiration accomplish in animals,

then we shall be better able to enquire into the nature of the disease produced by a vitiated atmosphere.

It has been long suspected by philosophers, physiologists, and chemists, that the air which we breathe undergoes some chemical changes, and various conjectures have been proposed concerning them, by different writers, at different times, and it was not until chemistry made some progress, that any thing precise was known. However, it is now acknowledged by all physiologists, that the essential object of all respiration is to convert absorbed fluids, chyle, lymph, and venous blood into arterial blood. The fluids brought from all parts of the body, to the right ventricle of the heart, are propelled by this organ into the parenchyma of the lungs, where, consequently, they come in contact with atmospheric air, when the carbon of the blood, uniting with the oxygen of the air, converts the venous into the arterial blood, which alone is fit for the purposes of life. The change which the blood undergoes in the lungs, not only fits it for the nutrition of our organs, but, by entering into their substance, it also keeps up their temperature in a permanent degree, whatever may be the temperature of the surrounding atmosphere. Of course the nerves exert their special influence in the function of calorification.

Previously to the chemical theory of respiration being established, it was thought that asphyxia was produced by a mechanical interruption to the entrance of the blood into the heart, and consequently the circulation of the blood. But it is now satisfactorily proved, by the direct and indisputable experiments of

Goodwyn, connected with those of Bichat, that asphyxia takes place from the interruptions given to those chemical changes necessary for converting venous into arterial blood, and that when persons die of asphyxia the system is, as it were, deprived of its *stimulus*, and becomes *poisoned* with its own blood.

Bichat has also shown that the primary effect of the circulation of venous blood is on the brain, and that this effect, through the intervention of the brain, to the whole nervous system.

It being admitted, that the circulation of venous blood tends to deprive the different organs of their stimulus, and consequently producing debility of the system, which effect is, in the first instance, upon the brain and spinal marrow, I think we may easily explain the varied symptoms which occur in Cholera.

The brain and spinal marrow spread their influence over all organic functions. Is it not by the influence of the nervous system being suspended, that we have seen the functions of respiration and digestion destroyed? Is it not by the same cause that the action of the heart has been suspended by Le Gallois, in his experiments on the spinal marrow? Has not Bulard checked some secretions by separating the nerves from the instruments of the secretions? Has not Brodie extinguished calorification by the same cause?

Seeing the various phenomena which may be produced from a want of proper nervous energy, and it being demonstrated that the circulation of venous blood deprives these organs of their proper stimulus, can we any longer be at a loss to account for the varied phenomena of the disease now in question? And

can we now doubt its essential nature? Do we not know that the same agents act differently in different individuals, according to the modes of application; according to predisposition, idiosyncrasy of constitution, &c. For instance, a hundred people may go to a theatre, and on the following day, all, although exposed to the same exciting cause, yet each will be attacked with a different disease; one a simple catarrh, others enlarged tonsils and inflamed pharynx, others again the lungs, whilst others are affected with a bowel complaint. Why then should not impure blood act in the same manner, by affecting different organs, according to their predisposition and exhibiting different symptoms, according to the degree of its impurity?

Let us now proceed to examine the condition of persons whose lungs have collapsed, and we shall find that all the constant, and therefore essential symptoms of this prevailing epidemic correspond accurately. From the remarkably instance given by Fourcroy, of the effects produced by the exhalations from opening graves, he states as follows: "From the report of the grave diggers, who were examined on the occasion referred to, that those men who happened to be immediately over a corpse, of which the abdomen was suddenly struck with a pickaxe, often fell down on a sudden, in a state of apparent death, while those who were at a greater distance and removed from the noxious effluvia in a more diluted state, were attacked with *nausea*, *giddiness*, *tremors*, and *faintings*.*

* Mark the analogy between the sudden attack of some patients, with the insidious approach of others who are affected with this Cholera, also the similarity of symptoms.

In the case of poisons, by inhaling carbonic acid gas mixed with air, we find the following account given of the sufferings of such individuals, in the Cyclopædia of Practical Medicine, “ *Head-ache, vertigo, nausea, heaviness, irresistible inclination to sleep, marked the first stage of the affection. The patient passes from sleep to coma, from which state it is impossible to rouse him, the pupils are dilated, respiration difficult, countenance flushed, lips livid, and pulse often full and strong. There is no gasping for breath, no painful struggle, no unutterable anxiety, no convulsion; the transition from life to death is calm and tranquil, and the functions and powers of the system, one by one, are extinguished, as if in obedience to the resistless spell of some potent enchanter.*” Such was the mode of death chosen by the younger Berthollet, when bent upon suicide.

Notwithstanding, that the actions of these two dissimilar morbid agents in the instances above detailed, tend to produce the same disease, viz. that of a state of asphyxia, yet do we not observe a difference in the train of symptoms? Such is the fact in every case of asphyxia, as in all other diseases, we cannot account for the numerous casualties which will occur in the course of a disease. And, as I do not pretend to explain in what this inhaled state of atmosphere consists, producing this dreadful malady, is it not fair to conclude, that its specific agency produces the modifications of effects which we observe in Cholera? Do the same symptoms invariably present themselves in fever, or in any other disease? Why then should we expect uniformity in this new disease more than in any other?

It is remarked by Le Fevre, that the variety of shapes under which the disease presents itself, is so great, that it is impossible to specify all the symptoms which characterize Cholera. The reason of this is far from being obscure. The brain and spinal cord hold a control over an extensive system of nerves, and it only depends upon the situation and degree of derangement, that the different nerves experience when those organs become poisoned with their own blood.

The following account, however, of the symptoms of this disease, such as is generally acknowledged to take place in England, corresponds so exactly with those detailed by Le Fevre, that I shall transcribe them. He observes, that the attack is generally ushered in by a sense of *weakness, trembling, giddiness*, nausea, violent retching, vomiting, and purging of a watery, starchy, whey coloured or greenish fluid. Those symptoms are accompanied or quickly followed by some cramps, generally beginning in the fingers and toes, and then extending to the wrists, and fore-arms, and calves of the legs, thighs, abdomen, and lower part of the thorax. These were soon succeeded by pain, constriction, and oppression of the stomach and præcordia, great sense of internal heat, inordinate thirst, and incessant calls for cold water, which were no sooner swallowed than rejected. The action of the heart and arteries now nearly ceased, the pulse either became altogether imperceptible at the wrists and temples, or so weak as to give to the fingers only an indistinct feeling of fluttering. The respiration was laborious and hurried, sometimes with long and frequently broken inspirations. The skin grew cold and clammy, covered with large drops of sweat, dark and

disagreeable to the feel, and discoloured, of a bluish, purple, or livid hue. There was great and sudden prostration of strength, anguish and agitation. The countenance became collapsed, the eyes suffused, fixed and glossy, or heavy and dull, sunk in their sockets, and surrounded by dark circles. The cheeks and lips livid and bloodless, and the whole surface of the body nearly devoid of feeling.

He further observes, that some were suddenly seized whilst walking in the streets, and seemed as if struck by lightning, of which I myself witnessed a case; others gradually, with what they supposed to be a slight bowel complaint, which they consequently neglected, till awakened to the real nature of the case, by the extremities becoming cold.

Let every lover of truth reflect upon the symptoms apparent in those persons who have died of collapse, and compare them with those observed in cholera; instantly the analogy must be evident; is there any thing wanting to prove the identity of the two states? For my part they appear perfectly analogous, and there is no symptom in Cholera which cannot be rationally accounted for. It would be useless here, to go through the whole catalogue of symptoms and explain their causes. Suffice it to say, that the present theory is fully capable of accounting for the numerous and varied features of the disease.

I shall now proceed to my third position, which is, that death from Cholera is caused by *Asphyxia*. Now this is a simple affair, because I have only to transcribe an account of the post mortem appearances of an individual who died of asphyxia from other known

causes, and we will compare them with the morbid appearances of those who have died of Cholera, as the disease is called. On inspecting the body after death from simple asphyxia, we find that it presents externally the marks denoting *imperfect oxidation* of the blood in the capillary vessels of the skin, which accordingly is dark, and in some places purple. The joints generally rigid in a greater degree than in other cases of sudden death; the features of the countenance have an expression of pain, the eyes are distended and prominent and the pupils dilated.*

In the interior of the body, the most striking appearance is, the great accumulation of blood that has taken place in the *pulmonary system* of vessels, in the right auricle and ventricle of the heart, and in the great veins; while, on the other hand, the left auricle and ventricle are comparatively empty. The *liver, spleen, and kidneys* are gorged with blood.

With respect to the invariable and striking appearances observed in the patients who have died of Cholera, every one must acknowledge that there exists no difference from the above statement. The very great congestion of the lungs forms the most striking and undeviating feature of alteration, which exists to such a degree that it has caused Dr. Hodgkin, one of the first morbid anatomists in Europe, to say, that he never saw so much congestion in this organ, as was present in the cases that he has examined.

So altered in character is the arterial blood in the aorta and large arterial trunks, that a portion of the

* Most of these appearances are observed in the Cholera Morbus.

abdominal aorta was cut out, which contained a large quantity of coagulated blood; and on presenting it to a very eminent physician, he pronounced it to be venous blood. In fact, congestion of the organs is the only appreciable change.

Hence a vitiated state of atmosphere being shewn to exist, as far as I am able, it being indisputably acknowledged, that the circulation of venous blood acts as a poison to the system; and the connection of respiration with life being admitted by all, no further detail needs be resorted to, in proving that the prevailing disease of England is a state of asphyxia.

Upon the foregoing theory I shall proceed to suggest a treatment. The remedies which I am about to suggest have been individually tried in different countries, and, according to report, with apparent success; but in order to give them a fair trial, they should be resorted to *simultaneously*, otherwise I doubt their success.

In order to remove the suspended functions, we must renew the contractions of the heart, by giving it additional nervous power, and by restoring to the body its heat and respiration, whilst we should give the patient as pure an atmosphere as possible. My first object is to be attained by *galvanism*, applied immediately to the head and spinal column. Then large quantities of oxygen must be diffused in the apartments, whilst the patient is made to inhale it. The hot air bath to the surface of the body, with warm *friction* over the chest, and warm applications to the extremities. If the patient can retain anything, a warm, *diffusible*, and *light nutritious stimulus* may be admin-

istered internally ; and if re-action takes place it may be necessary to abstract blood. Of course the consecutive symptoms will be attended to as they appear. But my chief reliance is upon the *simultaneous* employment of *galvanism, oxygen, warm friction*, and large draughts of some stimulating but nutritious drink.* If it were possible, I think it would be advisable to remove a patient immediately on the attack, from the atmosphere he has been respiring—say to a tent, erected at some open field, where the disease is known not to exist.

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* Some ale or beer may be tried.

